

Amendment and Response

Applicant: Frank Wiedmann

Serial No.: 10/756,838

Filed: January 13, 2004

Docket No.: I435.104.101/12881US

Title: METHOD AND DEVICE FOR PRODUCING DELAYED SIGNALS

IN THE CLAIMS

Please add claim 21-26.

Please amend claims 1, 3, 5, 7, 12, 14, 16, and 17 as follows:

1. (Currently Amended) A method for producing an output signal that is delayed compared to an input signal, comprising:

forming at least first and second intermediate signals delayed differently with respect to an input signal; and

combining the first and second intermediate signals to form an output signal having ~~a~~each rising edge determined by a that corresponds to an edge transitioning in a first direction of the first intermediate signal and having ~~a~~each falling edge determined by a that corresponds to an edge transitioning in the first direction of the second intermediate signal.

2. (Previously Presented) The method according to claim 1, wherein said forming step includes performing successive delay of the input signal to form the first and second intermediate signals.

3. (Currently Amended) ~~The~~A ~~method according to claim 2 for producing an output signal that is delayed compared to an input signal, comprising:~~

forming at least first and second intermediate signals delayed differently with respect to an input signal, wherein said forming step includes forming ~~2k~~2k intermediate signals respectively delayed ~~around $360^\circ/(2k)$~~ around $360^\circ/(2k)$ compared to the input signal, ~~wherein k is a natural number~~, and combining pairs of the intermediate signals whose delay relative to one another is around 180° to form respectively corresponding output signals; and

combining the first and second intermediate signals to form an output signal having a rising edge that corresponds to an edge of the first intermediate signal and having a falling edge that corresponds to an edge of the second intermediate signal.

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4. (Original) The method according to claim 3, wherein said combining step includes, in response to a control signal, using one of the first intermediate signal and an inversion of the second intermediate signal to form the output signal.

5. (Currently Amended) The method according to claim 4, wherein said forming step includes forming $2k$ intermediate signals respectively delayed around $360^\circ/(2k)$ compared to the input signal, wherein k is an even number and the control signal is one of the intermediate signals that has an absolute delay of around 90° with respect to both the first intermediate signal and the second intermediate signal.

6. (Original) The method according to claim 1, wherein said forming step includes regulating delay so that the intermediate signal with the largest delay experiences a delay of around 360° compared to the input signal.

7. (Currently Amended) ~~The~~A method according to claim 6 for producing an output signal that is delayed compared to an input signal, comprising:

forming at least first and second intermediate signals delayed differently with respect to an input signal, wherein said ~~regulating~~forming step includes regulating delay depending on the input signal, the intermediate signal with the largest delay, and a further one of the intermediate signals; and

combining the first and second intermediate signals to form an output signal having a rising edge that corresponds to an edge of the first intermediate signal and having a falling edge that corresponds to an edge of the second intermediate signal.

8. (Original) The method according to claim 7, wherein the further intermediate signal has a delay of around 90° compared to the input signal.

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9. (Original) The method according to claim 7, wherein said regulation step includes a first delay regulation signal reducing the delay of all intermediate signals, and a second delay regulation signal increasing the delay of all intermediate signals.

10. (Original) Method according to claim 9, wherein said regulating step includes generating the delay regulation signals according to the following relationship

Input Signal	Further Intermediate Signal	Intermediate Signal with Greatest Delay	First Delay Regulation Signal	Second Delay Regulation Signal
0	0	0	0	0
1	0	0	1	0
0	1	0	0	0
0	0	1	0	1
1	1	0	0	0
1	0	1	1	1
0	1	1	0	0
1	1	1	0	0

wherein 1 corresponds to a first signal level and 0 corresponds to a second signal level.

11. (Original) The method according to claim 1, including delaying an input timing signal to obtain the input signal.

12. (Currently Amended) The method according to claim 1 for producing an output signal that is delayed compared to an input signal, comprising:

forming at least first and second intermediate signals delayed differently with respect to an input signal; and

combining the first and second intermediate signals to form an output signal having a rising edge that corresponds to an edge of the first intermediate signal and having a falling edge that corresponds to an edge of the second intermediate signal, wherein said combining step

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includes, in response to a control signal, using one of the first intermediate signal and an inversion of the second intermediate signal to form the output signal.

13. (Previously Presented) The method according to claim 12, wherein the control signal is one of the intermediate signals that has an absolute delay of around 90° with respect to both the first intermediate signal and the second intermediate signal.

14. (Currently Amended) A device for producing an output signal that is delayed compared to an input signal, comprising:

an input for receiving the input signal;

at least first and second delay elements coupled to the input for producing respective first and second intermediate signals in response to the input signal; and

a circuit connected to the delay elements to form from the first and second intermediate signals an output signal having ~~each~~ rising edge determined by a that corresponds to an edge transitioning in a first direction of the first intermediate signal and having ~~each~~ falling edge that determined by a corresponding to an edge transitioning in the first direction of the second intermediate signal.

15. (Original) The device according to claim 14, wherein the delay elements are connected in series.

16. (Currently Amended) ~~The~~A device according to claim 15, including for producing an output signal that is delayed compared to an input signal, comprising:

an input for receiving the input signal;

2k of the delay elements connected in series for producing respective intermediate signals, each of the delay elements for producing a delay of around $360^\circ/(2k)$, wherein k is a natural number, and including the delay elements including at least first and second delay elements coupled to the input for producing respective first and second intermediate signals in response to the input signal; and

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~~k of said~~ circuits connected to the delay elements, each of the circuits for receiving a pair of the intermediate signals that are delayed with respect to one another by around 180° and for forming therefrom a corresponding output signal, wherein one of the k circuits is connected to the delay elements to form from the first and second intermediate signals an output signal having a rising edge that corresponds to an edge of the first intermediate signal and having a falling edge that corresponds to an edge of the second intermediate signal.

17. (Currently Amended) The device according to claim 14, wherein each of the k circuits comprises a multiplexer.

18. (Original) The device according to claim 14, wherein the delay elements are controllable, and including a delay regulation device coupled to the delay elements for controlling the delay elements so that the intermediate signal with the largest delay has a delay of around 360° compared to the input signal.

19. (Previously Presented) The device according to claim 14, wherein the first delay element successively delays the input signal to form the first intermediate signal and the second delay element successively delays the input signal to form the second intermediate signal.

20. (Previously Presented) The device according to claim 14, wherein the output signal is formed from the first intermediate signal and an inversion of the second intermediate signal.

21. (New) A device for producing an output signal that is delayed compared to an input signal, comprising:

an input for receiving the input signal;

at least first and second delay elements coupled to the input for producing respective first and second intermediate signals in response to the input signal;

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a delay regulator configured to regulate delay of the delay elements based on the input signal, the intermediate signal with the largest delay, and a further one of the intermediate signals; and

a circuit connected to the delay elements to form from the first and second intermediate signals an output signal having a rising edge that corresponds to an edge of the first intermediate signal and having a falling edge that corresponds to an edge of the second intermediate signal.

22. (New) The method of claim 1 wherein the corresponding edge of the first intermediate signal and the corresponding edge of the second intermediate signal transition in a rising direction.

23. (New) The method of claim 1 wherein the corresponding edge of the first intermediate signal and the corresponding edge of the second intermediate signal transition in a falling direction.

24. (New) The device of claim 14 wherein the corresponding edge of the first intermediate signal and the corresponding edge of the second intermediate signal transition in a rising direction.

25. (New) The device of claim 14 wherein the corresponding edge of the first intermediate signal and the corresponding edge of the second intermediate signal transition in a falling direction.

26. (New) The device of claim 16 wherein each of the delay elements produce a delay of around $360^\circ/(2k)$, wherein k is a natural number